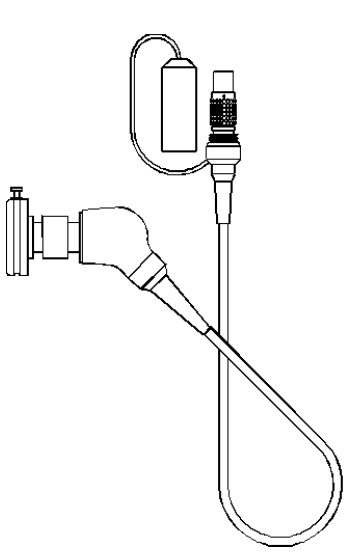
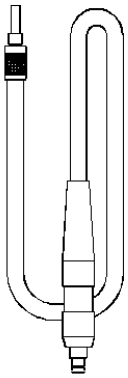
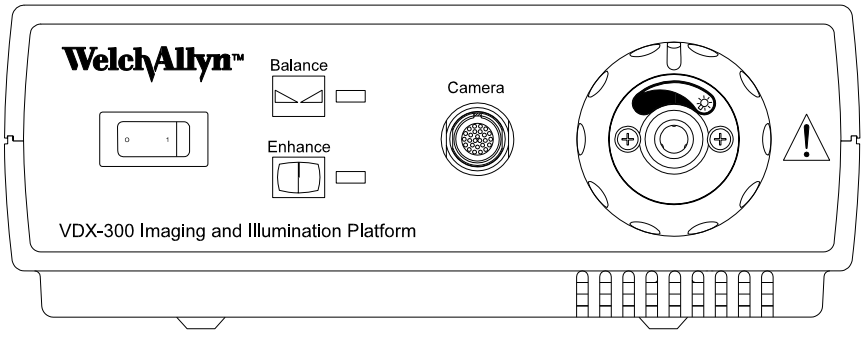
Manuals
Operation Manual

VDX-300 Service Manual







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Rev. A

To Service Personnel:

The information in this manual is subject to change without notice and should not be construed as a commitment by Welch Allyn, Inc.

Welch Allyn assumes no responsibility for any errors that may appear in this manual. If the product and/or its operation varies significantly from any description herein, please contact the Welch Allyn Imaging Products Group Product Service Department at 4619 Jordan Road, Skaneateles Falls, New York 13153, (315) 685.4108.

This product has been designed to provide a high degree of safety and reliability. However, we can not guarantee against the deterioration of components due to aging and normal wear.

All service and repairs must be performed by authorized Welch Allyn personnel or agents, using Welch Allyn replacement parts. Failure to do so will invalidate the product warranty.

Authorized service centers should refer to repair specification P02604 and P02638 for proper test and device history record requirements.

Please refer to the product warranty for specific coverage.

Welch Allyn™
Medical Products
Imaging Products Group
4619 Jordan Road
Skaneateles Falls, New York 13153-0220
USA
315 685.4108

Limited Warranty

Welch Allyn warrants the VDX-300, when new, to be free of defects in material and workmanship and to perform in accordance with manufacturer's specifications when subjected to normal use and service for a period of one year from the date of purchase from Welch Allyn or an authorized agent. Welch Allyn will either repair or replace any components found to be defective or at variance from manufacturer's specifications within this time at no cost to the customer. It shall be the purchaser's responsibility to return the instrument directly to their authorized distributor, agent or service representative.

This warranty does not cover the Sōlarc™ lamp, breakage, or failure due to tampering, misuse, neglect, accidents, improper installation, modification, or shipping, or to improper maintenance, service, and cleaning procedures. This warranty is also void if the instrument is not used in accordance with manufacturer's recommendations or if repaired or serviced by other than Welch Allyn or an authorized agent. Purchase date determines warranty requirements. No other express or implied warranty is given.

For service assistance or questions regarding this warranty, please call Welch Allyn product service at (315) 685-4108.

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Section

1

General Information

Introduction

The Welch Allyn VDX-300 Illumination and Imaging Platform offers surgical quality video imaging that enhances diagnostic capabilities, and provides excellent endoscopic images. In this product, Welch Allyn has combined a compact light source with a very small remote video camera, which can be attached to nearly all rigid or flexible scopes. By engineering both the video and the illumination end of the product, Welch Allyn is able to produce a very small, highly efficient product. Furthermore, by combining illumination and imaging in a single package, Welch Allyn has dramatically decreased the burden of system setup while offering features such as edge enhancement for greater definition of colors and shapes, automatic exposure control, and white balance for optimal color balance with every instrument offered in the platform. The result is a compact, affordable illumination and video system for rigid and flexible endoscopic procedures.

Basic System Description

There are three major components to the VDX-300: the Platform Box, the Camera Head Assembly, and the Fiber Optic Bundle. The centerpiece of the Power Box is an advanced Welch Allyn lamp which produces the same quality output as a high wattage Xenon arc lamp, but generates only a fraction of the heat. The Welch Allyn lamp produces a virtual "point source" of light, and is specifically designed to couple with a fiber optic bundle. The camera used in the VDX-300 is an advanced SONY 1/2 inch CCD camera in a Panasonic package. This camera uses the proprietary HyperHAD microlens architecture, whereby a microscopic light gathering lens is positioned over each pixel on the CCD, making the CCD extraordinarily sensitive to light. The camera also operates in Auto-Shutter mode. The three major components of the this system are shown below.

Figure 1:
VDX-300 Basic Description

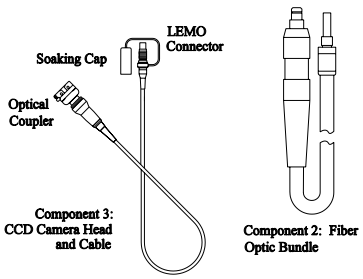
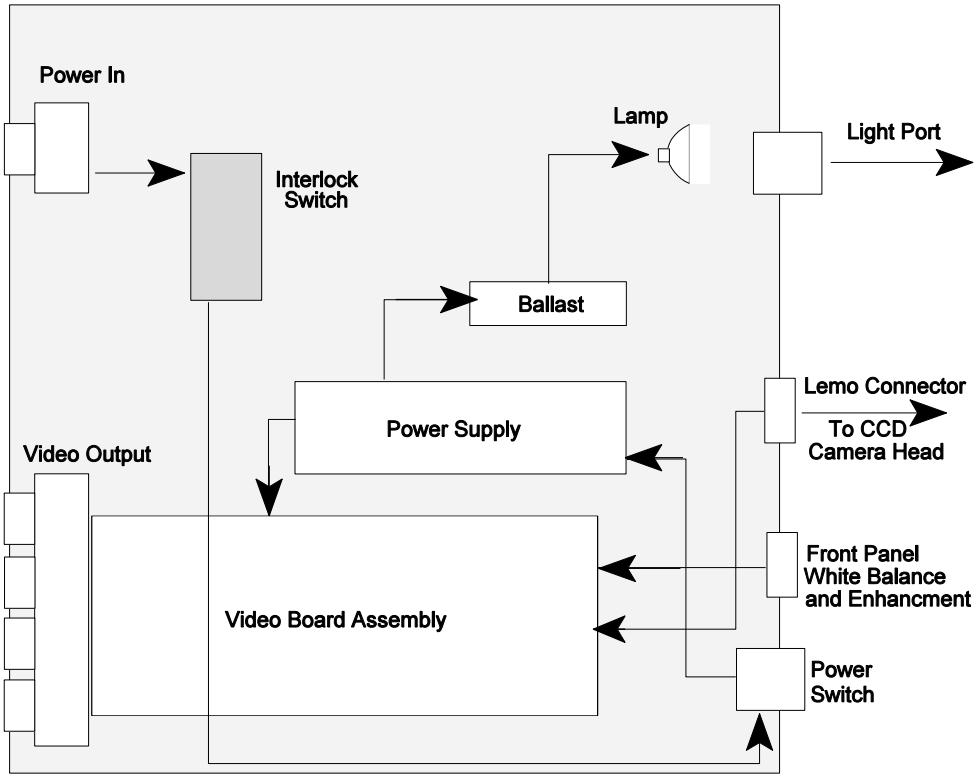


Figure 2: VDX-300 Functional Block Diagram



Major Component Description: Platform Box

The VDX-300 Platform Box is driven by a universal switching power supply, which accepts 100-240 VAC, 50/60 Hz without having to be adjusted. This power supply automatically senses line voltage, and makes the correct adjustments for any line input. This power supply is Medical Grade, and is approved for medical standards by UL, CSA, and TUV.

Power is supplied to two primary functions in the Platform Box: illumination and video processing. For illumination, a ballast is used to ignite and operate the lamp. The lamp used in the VDX-300 is a proprietary Welch Allyn miniature arc lamp, which provides superior illumination in a package only a fraction of the size of typical endoscopic light sources. Both the lamp and the ballast are manufactured by Welch Allyn. Power is also supplied to a SONY/Panasonic Camera, which is used to process the video image. A video delay circuit accounts for the distance between the CCD and the camera processor.

A video input, processing, and output board assembly provides two S-Video and two composite video signal outputs. All of these components are diagrammed in the functional diagram above; front and rear panel diagrams are shown below.

Major Component Description: Platform Box (Continued)

For illumination, a proprietary ballast is used to ignite and operate the lamp. The lamp used in the VDX-300 is the proprietary Welch Allyn Sōlarc miniature arc lamp, providing superior illumination in a package a fraction of the size of the typical high intensity light source. Both the lamp and the ballast are manufactured by Welch Allyn.

Figure 3: VDX-300 Platform Box Front Panel

1. Power Switch
2. White balance
3. Enhancement
4. Camera Connector Port
5. Fiber Optic Illumination Port
6. Light Intensity Control Knob

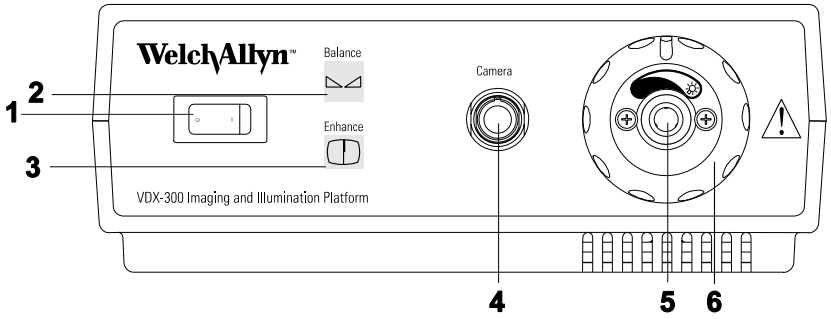
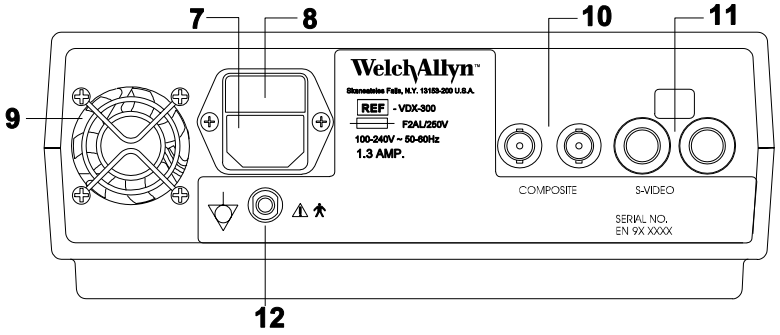


Figure 4: VDX-300 Platform Box Rear Panel

7. AC Power Input
8. Fuse Drawer
9. Fan/Grill
10. Composite Video Outout
11. S-video Output
12. Potential Equalization Stud



Major Component Description: Camera Head

The camera head assembly is made of a SONY 1/2 inch CCD in a Panasonic package. The camera is designed and assembled into a handpiece with a ten foot video cable, LEMO connector, and a soaking cap. The CCD used incorporates HyperHAD architecture, making the chip extremely sensitive to light. A C-Mount optical coupler is a separate component which screws onto the camera head.

Major Component Description: Fiber Optic Bundle

A 5mm diameter fiber optic bundle is an accessory in the VDX-300 product. This bundle uses an ACMI standard fitting on the Platform Box end, and has a universal light post on the scope end. The bundle accepts three scope adapters (Wolf, Storz and ACMI) that can be fitted on to the universal post. Other adapters are available upon request.

Specifications

The specifications for the Welch Allyn VDX-300 are as follows:

Power Supply

100-240~, 50-60 Hz, automatically adjusted
Input Current: 1.3 Amps MAX

Dimensions

9.0 inches (22.9 cm) wide x 7.0 inches (17.8 cm) deepx 3.5 inches (8.9 cm) high
8 pounds (3.63 kg)

Outputs

2 S-Video Y/C Type
2 Composite, BNC type, 1.0 V p-p 75 ohms

Illumination System

Proprietary Welch Allyn Solarc® Arc Lamp
Color temperature 5500 degrees K
Lamp voltage 60 Volts, 24 watts
Lamp life averages 550 hours when used for a 45 minute ON/15 minute OFF duty cycle.
Average lamp life decreases when shorter duty times are used.

Shutter System

Electronic Auto Shutter
Manually Operated Front Panel Light Control

Image Device

1/2" SONY Interline Transfer CCD with HyperHAD
768 x 494 Total Pixels (NTSC)
756 x 581 Total Pixels (PAL)
Cable Length 10 feet

Scanning System

2:1 Interlaced, 525 lines, 30 frames/sec (NTSC)
2:1 Interlaced, 625 lines, 25 frames/sec (PAL)

Horizontal Resolution

Greater than 470 lines

Fiber Optic Bundle

Platform Box Side: ACMI
Scope Side: Universal
Bundle Length: 7.5 feet
Diameter: 5mm

Approvals

UL-2601, EN60601-1, IEC601-1, IEC601-2-18, and CAN/CSA 601.1
93/42/EEC Medical Device Directive

Equipment Classification

Power Box - Class I
Camera Head - IPX7, Type BF

Environmental

Storage

Humidity:	10 to 100% (condensating)
Temperature:	-20 deg. C to +60 deg. C
Pressure:	500 hPA to 1060 hPA

Operating

Humidity:	10 to 95% (non-condensating)
Temperature:	+5 deg. C to +40 deg. C

Fuses

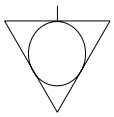
250V, 2.0 amps, 5 x 20mm, Type F2AL

USA Patents

5,420,477, 5, 144, 204, 5,117,154, 5,311,859, 5,144,190, 5,083,059, 5,291,100, 5,138,228; others pending

System Symbol Descriptions

Attention. Read Service Manual for Warnings, Precautions, and Instructions for Use.

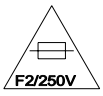


Potential Equalization Stud

Dangerous Voltage

TYPE B Equipment

Type BF Equipment

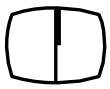


Warning. Risk of Fire. Replace Fuses as Marked.

Intense heat may be emitted. Use extreme caution when handling.

ESD Warning. Many of the electronic devises in this equipment are static sensitive.

Balance



Enhance

Section

2

Service

Intent of Manual

The purpose of this manual is to provide Welch Allyn Inc. authorized service representatives with systematic guidelines for preventative maintenance, problem identification, and service of the VDX-300 Illumination and Imaging System. We have included the theory of operation, schematic diagrams, simplified drawings, service tips and procedures, to assist a trained service representative with board level repairs. Should you encounter problems that are beyond the scope of this manual, please contact Welch Allyn's Imaging Products Group Service Department for assistance.

Required Tools for Service

You will need only standard electronic and mechanical tools to perform board level repairs. Test equipment must be in good condition and calibrated regularly. The following commercially available tools are required for the repairs included in this manual.

Antistatic Workstation

DVMS Milli-ohmmeter Fluke Model 77 or equivalent

Calibrated, NTSC or PAL video monitor, SONY PVM 1350 or equivalent preferably Medical Grade.

Associated Research 411 AI AC Hipot Jr or Equivalent

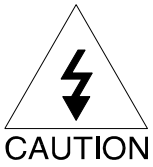
Hipot Shorting Plug

40W Soldering Iron

Welch Allyn Tools: These tools can be purchased from Welch Allyn (Welch Allyn Tool Number appears in parentheses).

Leakage Tester (WT-5515) or Equivalent
LEMO Connector HyPot Test Tool
Front Panel LEMO Removal Tool
Final Test Spec P02604

Words of Caution



High Voltage

Use caution when servicing an VDX-300 system. When servicing the unit, potentially dangerous high voltage levels are exposed. Disconnect the power cord whenever possible to avoid electric shock.

Static Electricity (ESD)

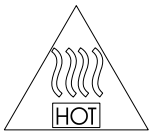
Adhere to standard ESD practices at all times when servicing this equipment. Many of the electronic devices in this equipment are static sensitive, and may suffer catastrophic or latent failure if handled improperly.

Fiber Optics

If it is necessary to handle exposed fiber optic glass, use extreme caution. Unnoticed broken or loose fibers can get in your fingers, hair, and clothing. Avoid contact with eyes or face during and directly after fiber optic contact. Wash hands thoroughly after fiber optic contact.

Finished Parts

Handle all finished parts with care. The finish can be easily scratched or damaged from poor or improper handling.



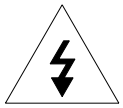
Heat

Lamps, power supplies, and heat sinks may emit extreme amounts of heat during and after operation. Approach and handle these and other potentially hot components with caution.

WARNINGS/CAUTIONS

CAUTION: IF THIS IMAGING AND ILLUMINATION SYSTEM IS USED DURING INVASIVE SURGERY, THE FAILURE OF A COMPONENT WITHIN THE SYSTEM, FOR EXAMPLE, LOSS OF VISUALIZATION, MAY INDIRECTLY CAUSE RISK TO THE PATIENT, THEREFORE, IT IS RECOMMENDED TO HAVE ALTERNATIVE MEANS AVAILABLE.

1. POSSIBLE EXPLOSION HAZARD. Do not use in the presence of flammable anesthetics.



CAUTION

2. THE TOP COVER OF THIS BOX SHOULD NEVER BE REMOVED. ELECTRICAL SHOCK HAZARD DUE TO HIGH INTERNAL VOLTAGE. THERE ARE NO USER SERVICEABLE PARTS INSIDE THIS IMAGING AND ILLUMINATION SYSTEM, EXCEPT FOR THE LAMP AND FUSE WHICH ARE ACCESSIBLE THROUGH THE BOTTOM AND BACK COVER PANELS.

3. PROVIDE VENTILATION TO PREVENT OVERHEATING.
   Provide adequate ventilation.
   Do not cover or drape imaging and illumination system.

4. Grounding reliability is achieved only when connected to "hospital-use" or "hospital-grade" receptacle. Inspect electrical plug and cord routinely. Do not use if damage is discovered.

5. WARNING: TOTAL SYSTEM RISK CURRENT - EXCLUDING THE PATIENT APPLIED PART (ENDOSCOPE) - SHOULD NOT EXCEED 100 MICROAMPS. AN ISOLATION TRANSFORMER IS REQUIRED IF TOTAL SYSTEM RISK CURRENT EXCEEDS 100 MICROAMPS WHEN ACCESSORIES ARE INTERCONNECTED. REFER TO OPERATING MANUAL FOR RECOMMENDED ISOLATION TRANSFORMERS AND PROPER MEASURING TECHNIQUES.

6. CAUTION: Always remove camera system from patient before connecting/disconnecting camera system to imaging and illumination system.

7. When possible, keep imaging and illumination system out of patient field. Always remove surgical imaging system from patient field while connecting/disconnecting camera.

8. Do not sterilize the imaging and illumination system. Refer to Operating Manual for cleaning instructions.

SEE OPERATING MANUAL FOR ADDITIONAL WARNINGS, PRECAUTIONS AND INSTRUCTIONS FOR USE.

Additional Warnings and Precautions

To ensure patient and operator safety, read and understand this manual before using the VDX-300.

External equipment, which will be connected to signal input and signal output parts or other connectors, shall comply with relevant IEC standard (IEC 601 series for medical electrical equipment). In addition, all such combinations - *systems*- shall comply with the standard IEC 601-1-1 (Safety requirements for medical electrical systems).

Any person who connects external equipment to signal input and signal output parts or other connectors has formed a system and is therefore responsible for the system to comply with the requirements of IEC 601-1-1.

WARNING: Replace fuses as marked. See Fuse Replacement Section.

WARNING: The high intensity light at the front of the Platform Box, at the tip of the Fiber Optic Bundle, and at the tip of the endoscope may give rise to high temperatures. To minimize the risk of injury, avoid prolonged contact with tissue.

Be sure that the Fiber Optic Bundle and Camera Head are plugged securely into the Platform Box before turning the power ON.

Do not switch the VDX-300 system ON and OFF in rapid succession. Doing so will dramatically shorten lamp life. The lamp needs to "cool down" for approximately 10 to 15 seconds between uses; if the user turns the VDX-300 from **ON** to **OFF** and then immediately back **ON**, the lamp will not start.

Since the VDX-300 uses a custom, proprietary Welch Allyn lamp, **always have a spare lamp available for lamp replacement.**

Always attach the soaking cap to the camera connector before soaking.

Do not disconnect the Optical Coupler from the Camera Head before soaking, as this will make it possible for fogging to occur between the Camera Head and the Optical Coupler.

Do not remove the camera cable from the Platform Box during operation (procedural use).

Do not store liquids above or on the VDX-300.

Do not attempt to service any part of this product except for lamp and fuse replacement.

WARNING: If used during invasive surgery, a spare system should be kept on standby.

This equipment is not "CF" (cardiac) rated. Remove the endoscope from the patient prior to the usage of a cardiac defibrillator.

When connecting the camera connector to the platform box, be sure to engage the "Lemo Shell Latch".

Performance Checks

The following performance checks will help you (1) determine whether or not the VDX-300 is operating correctly, and (2) isolate a problem, if there is one.

System Set-up
Make sure that the VDX-300 is connected as follows:

1. Be sure that power is being provided by the wall outlet. Plug the power cord into the back of the VDX-300 and plug in the video monitor. **Do not turn the power on.**

2. Plug the fiber optic bundle into the light port on the Platform Box, and plug the Camera Head cable into the platform box. The Camera Head should have a C-Mount coupler attached. Attach the Fiber Optic Bundle and Camera Head to an endoscope (preferably a 10mm diameter laparoscope).

3. Be sure that the video monitor is functioning properly. This may involve connecting a different camera or VCR through the same composite or S-video connector.

4. Connect both the S-video and the composite video cables between the VDX-300 and the tested video monitor.

5. Turn POWER switch on both the video monitor and the VDX-300 to "ON". After 5-10 seconds of warming up, the lamps will produce a steady, white light, which should come through the tip of the laparoscope. A high quality video image should be displayed on the monitor. Do no repeatedly turn the VDX-300 On and Off; the lamp needs 10-15 seconds to "cool down" between uses.

If these conditions do not occur, see the troubleshooting section.

System Inspection

Prior to use, inspect the camera cable, head, and connectors for signs of wear. Ensure that the optical coupler is securely attached to the Camera Head. Likewise, the Fiber Optic Bundle should be inspected for abnormalities. Be sure that the proper adapters are used on the Fiber Optic Bundle in order to make a secure connection between the Fiber Optic Bundle and the scope. Finally, before plugging the Camera Head into the Platform Box, check that it is dry and free of rinsing and/or soaking solution.

Testing the CCD/Video Connections

1. Remove the Camera Head (with coupler) from the endoscope.

2. Cover the Camera Head with your hand, so that no light gets into the CCD.

3. Inspect video monitor. Ensure that the Enhance feature is **OFF.** There should be minimal electronic noise displayed.

4. Wiggle the LEMO connector, and inspect the monitor. There should be no increase in electronic noise.

5. Wiggle the strain relief near the Camera Head and inspect the monitor. There should be no increase in electronic noise.

Testing the Light Control Functions

1. Reattach the Camera Head (with coupler) to the endoscope. The fiber optic light guide should also be attached.

2. Place your hand 12 inches away from the endoscope tip. Quickly move your hand to 1/2 inch away from the endoscope and observe the monitor. The VDX-300 should take about one or two seconds to adjust from a bright scene to a normal scene. Repeat the procedure several times.

3. Adjust the light Intensity Control Knob to its minimum position and inspect the monitor. The picture should be slightly darker. Repeat the hand test above. The VDX-300 should still be able to adjust to different lighting coniditions, although the brightness of the video image will remain constant.

4. Adjust the Light Intensity Control Knob to its maximum position, and inspect the monitor. The picture should appear bright and normal. Repeat the hand test from step 2. The VDX-300 should still be able to adjust to different lighting conditions, although the brightness of the video image will remain constant.

5. NOTE: the electronic auto shutter should take about one or two seconds to adjust from a 12 inch distance to a 1/2 inch distance. This is normal.

Testing Enhancement Functions

1. Place your hand approximately 3 inches from endoscope tip and adjust focus on coupler.

2. Press the enhancement control. The enhancement LED should activate and the image should become "sharper".

3. Press the Enhancement control again. The enhancement LED should turn off and the image should return to its original state.

Testing White Balance Functions

1. Focus the endoscope on a white target, positioned approximately one inch away from the distal tip.

2. Press the Balance Control and the balance LED will flash while the system is calibrating. The image will also shift color to white as the LED is flashing.

3. Since the VDX-300 has white balance memory, the LED might not flash or may only flash once if the system was previously white balanced.

4. Use a non-white target (i.e. manilla folder) and repeat steps 1 and 2 above. Repeat again with a white target.

Calibrations

Routine electrical calibration of the VDX-300 is not required. All electrical parameters are factory set.

Routine calibration of video monitors is highly recommended. Refer to your video monitor service manual for instructions on calibration and video alignment.

Section

3

Problem Solving

Troubleshooting

Experience shows that many service calls are due to improper operator technique and poor connections. Before taking apart the VDX-300 system, make sure that setup errors are not causing the problem. **When checking voltages or signals, be sure to verify signal through the harness wires, connectors, and on the circuit board.** Reference numbers in parentheses, such as (A5), refer to the Interconnect Diagram located in APPENDIX A.

Symptom	Possible Cause	Procedure
No image, lamp not illuminated	Power line cord damaged or disconnected	Connect, repair, or replace as necessary.
	Power is not turned to "ON"	Turn power on.
	Defective On/Off Switch	Replace On/Off Switch.
	Interlock switch disengaged or defective	Verify that lamp replacement door is firmly and properly secured in place.
		Verify interconnect to and from switch.
		Verify switch is fuctioning properly. Replace as necessary.
		Verify post on lamp door is adjusted properly**.**
	AC line fuses F1 and F2 open	Replace fuses F1 and F2 on Rear Panel Appliance Inlet (J100).
	Open circuit connection	Verify AC input through unit to the Power Supply (A5).
	Power supply circuit defective	Check for: 110-240 VAC in at J1 +15V output at J2 *If F1 fuse is blown:* Disconnect P2 and J2 on the power supply. Replace F1 fuse. Reapply power. Verify output voltages at J2. If voltage is not present or if fuse blows again, replace power supply.
	Other circuits loading down power supply	Disconnect and isolate video output board assy by removing connector P9.
		Disconnect and isolate ballast board (A6) by removing connector P2B.

Symptom	Possible Cause	Procedure
Lamp does not illuminate.	Defective or worn lamp	Replace lamp.
Lamp does not illuminate**, even with new lamps**	Defective ballast	Check for +15V across pins 1 and 2 of connector P2B on ballast (A6).
		Using a known good lamp or a 151 ohm/50 watt resistor, measure approximately 60V DC at P1 and P2 pins of ballast output.
		Measure DC voltage across P1 and P2 without lamp. Load to be approximately 9V. Note to wait for lamp start-up routine to complete (Approx. 7-8 sec.) before testing in order to avoud damaging your meter.
		If P1 and P2 measure 0 volts, replace Ballast.
		Listen for ballast ignition pulses on power up without lamp connected.
	Defective lamp connector	Assure Connector is fully engaged.
		Check continuity and replace if defective.
	Bad test lamp	Substitute 151 ohm/50 watt resistor for lamp if necessary and verify 60 VDC across P1/2.
No image, lamp is illuminated	Improper system setup	See Operating Manual.
	Defective Camera Head	Use test camera head and check for video image. Replace Camera Head as necessary.
	Flex Ckt interconnect (W007) disconnected or defective (worn)	Verify proper connection. Reseat or replace as necessary.
	Video board set assembly defective	Verify and replace as necessary.
Poor Lamp Illumination	Lamp has dislodged (Excessive Impact)	Verify and reseat lamp.
	Lamp life is near end of cycle	Replace Lamp.
	Fiber bundle entry/exit end obstructed	Verify and clean as necessary.
	Fiber bundle life is near end of cycle	Verify and replace bundle as necessary.

Symptom	Possible Cause	Procedure
Picture failure (random or intermittent) after unit warms up, Lamp is illuminated	Poor video connections	Check connectors and wire integrity.
		Follow same procedure as No Video Image and Lamp Illuminated.
	Damaged Camera Head/Cable	Visually inspect entire cable. Flex wire cable while observing cable to check for broken wires or connections.
		Vibrate probe while observing video picture.
	Defective Video Board Assy (Output Board)	Verify +15V, +12V and video signal input and output on Output Board (A4). Replace Video Board Set Assy as necessary.
	Intermittent Power Supply	See Power Supply Troubleshooting section.
	Intermittent Interconnect	Check connectors between circuit boards for intermittent connections.
Picture aberration (loss of color at close or medium views, but satisfactory colors at distant views), or video smearing on edge or corner of image	Defective or damaged flex circuit inside camera head assembly	Replace Camera Head assembly.
Probe unable to withstand 8 psi pressure test	Leak at LEMO cap	Replace LEMO cap, and retest.
	Window retainer not secure	Tighten window on Camera Head with Window Removal Tool WT-1809.
White balance or Edge Enhancement fail to function	Flex ckt (W006) disconnected, worn, or damaged	Reseat or replace Front Panel Assembly.
	Front Panel Light Control Board defective	Replace Front Panel Assembly.
	Video Board Assembly defective	Replace Video Board Assembly.

Connector Pinouts

Use the following tables during troubleshooting to help locate signals.

	Connector	Pin	Name	Description
Switched Mode Power Supply (A5)	J1	1-2	LINE	AC input power
	J2	1	+15V	15V DC Supply
		2	+15V	15V DC Supply
		3	GND	Common
		4	GND	Common

	Connector	Pin	Name	Description
LEMO Board (A7)	J2	1	SCLK	
		2	RBIAS	
		3	V1	
		4	V2	
		5	V3	
		6	SDA	
		7	+6V	
		8	CCD OUT	
		9	GND	
		10	+15V	
		11	VL	
		12	VSLB	
		13	OPT1	
		14	OPT2	
		15	GND	
		16	GND	
		17	+15V	
		18	GND	
		19	WB	
		20	OPT3	
		21	MODE2	
		22	MODE1	
		23	EH	
		24	RESET	
		25	H	
		26	V4	

Input Board (A7)

Connector	Pin	Name	Description
J4	1	BALLED2	
	2	BALLED1	
	3	ENHSW2	
	4	ENHSW1	
	5	ENHLED2	
	6	ENHLED1	
	7	WBSW2	
	8	WBSW1	
	9	WBLED2	
	10	WBLED1	
J5	1	SCLK	
	2	RBIAS	
	3	V1	
	4	V2	
	5	V3	
	6	SDA	
	7	+6V	
	8	CCD OUT	
	9	GND	
	10	+15V	
	11	VL	
	12	VSLB	
	13	OPT1	
	14	OPT2	
	15	GND	
	16	GND	
	17	+15V	
	18	GND	
	19	WB	
	20	OPT3	
	21	MODE2	
	22	MODE1	
	23	ENH	
	24	RESET	
	25	H	
	26	V4	
J6	1	MODE2	
	2	ENHANCE	
	3	GND	
	4	+15V	
J7	1	N/C	
	2	N/C	
	3	N/C	

	Connector	Pin	Name	Description
Video Board (A3)	J1 Front	1	CCD (OUT)	
		2	+18V	
		3	-8V	
		4	R-BIAS	
		5	+6V	
		6	SDA	
		7	SCL	
		8	SUB	
		9	V1	
		10	V2	
		11	V3	
		12	V4	
		13	GND	
		14	MODE 1	
		15	H	
		16	RESET	
		17	CAMDET	
		18		
	J2 Front	1	+5V	
		2	+3.5V	
		3		
		4	I0 (WB1)	
		5	I1 (WB2)	
		6	I2 (AUTO)	
		7	13 (GAIN)	
		8	I4 (SET)	
		9	I12 (CA1)	
		10	I13 (CA2)	
		11	I14 (SCO)	
		12	I15 (SCI)	
		13	VR1 (R)	
		14	VR2 (B)	
		15	VR3 (LVL)	
		16	O1 (LED)	
		17		
		18		

Video Board (A3) [continued]

Connector	Pin	Name	Description
J1 REAR	1	+12V IN	
	2	+12V IN	
	3	G/L IN	
	4	VD IN	
	5	VIDEO 1	
	6	VIDEO 2	
	7	S OUT	
	8	C OUT	
	9	GND	
	10	GND	
	11	GND	
	12	GND	
	13	TEST	
	14	VD	
	15	GND	
	16	SCK	
	17	S10	
J2 REAR	1	+5V	
	2	+3.5V	
	3	GND	
	4	GND	
	5	GND	
	6	I5 (ELC)	
	7	I6 (AGC)	
	8	I7 (DTL)	
	9	I8 (BLC1)	
	10	IP (BLC2)	
	11	I10 (WBVR)	
	12	I11 (FL)	
	13	I12 (CA1)	
	14	I13 (CA2)	
	15	I14 (SCO)	
	16	I15 (SC1)	
	17	VR4 (H)	
	18	VR5 (SC)	

Output Board (A4)

Connector	Pin	Name	Description
P1	1	+12V IN	
	2	+12V IN	
	3	G/L IN	
	4	VD IN	
	5	VIDEO 1	
	6	VIDEO 2	
	7	S OUT	
	8	C OUT	
	9	GND	
	10	GND	
	11	GND	
	12	GND	
	13	TEST	
	14	VD	
	15	GND	
	16	SCK	
	17	S10	
	18		
P2	1	+5V	
	2	+3.5V	
	3	GND	
	4	GND	
	5	GND	
	6	I5 (ELC)	
	7	I6 (AGC)	
	8	I7 (DTL)	
	9	I8 (BLC1)	
	10	IP (BLC2)	
	11	I10 (WBVR)	
	12	I11 (FL)	
	13	I12 (CA1)	
	14	I13 (CA2)	
	15	I14 (SCO)	
	16	I15 (SC1)	
	17	VR4 (H)	
	18	VR5 (SC)	
J3	1	GND	
	2	GND	
	3	SVHSY1	
	4	SVHSC1	
J4	1	VID 1	
J5	1	VID 2	
J6	1	TEST	
	2	VD	
	3	GD	
	4	SCK	
	5	S10	
	6		
J7	1	GND	
	2	GND	
	3	SVHSY2	
	4	SVHSC2	

Output Board (A4) [continued]

Connector	Pin	Name	Description
J8	1	+15V	
	2	GND	
	3	ENHANCE	
	4	MODE 2	
J9	1	+15V	15V DC Supply
	2	+15V	15V DC Supply
	3	GND	Common
	4	GND	Common

Ballast Board (A6)

Connector	Pin	Name	Description
J1B	N/C		
J2B	1	GND	
	2	+15V	
P1	+V		
P2	-V		

Section

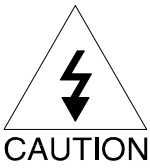
4 Disassembly and Repair

About This Section

This section describes how to remove and replace major sub assemblies of the VDX-300 Platform Box. To find an assembly, refer to "Parts List & Exploded View" on Page 28.

Removal and Replacement Warnings

Before proceeding, be aware of the following:

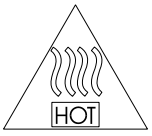


High Voltage

Use caution when servicing a VDX-300 system. When servicing the unit, potentially dangerous voltage levels are exposed. Disconnect the power cord whenever possible to avoid electric shock.

Static Electricity (ESD)

Adhere to standard ESD practices at all times when servicing this equipment. Many of these electronic devices in this equipment are static sensitive, and may suffer catastrophic or latent failure if handled improperly.



Heat

Lamps, power supplies, and heat sinks may emit extreme amounts of heat during and after operation. Approach and handle these and other potentially hot components with caution.

When removing an assembly, pay attention to the wire and connector positions, to facilitate prompt reassembly.

Exploded View Diagrams

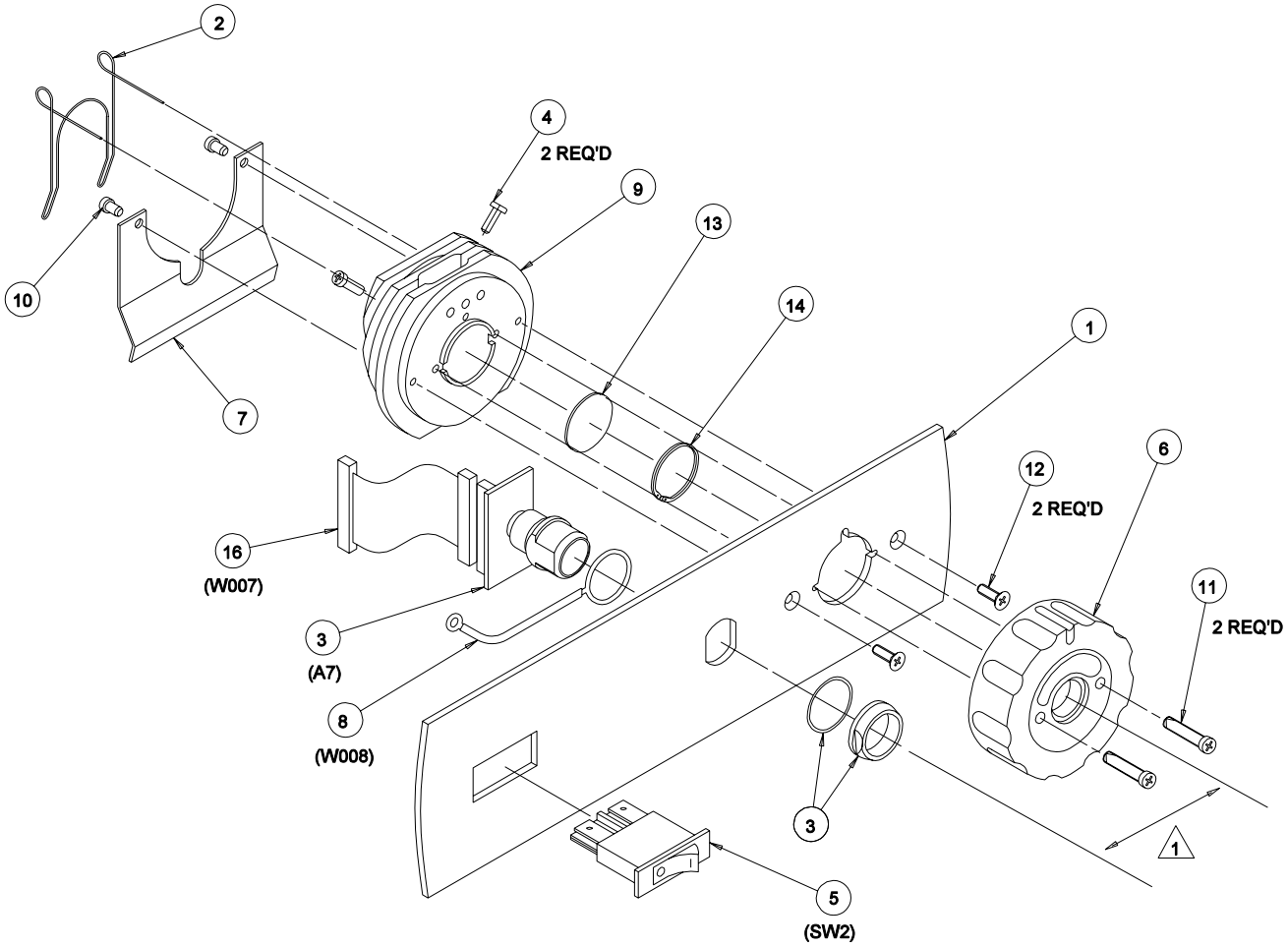
In the following section, there are five exploded view drawings, with breakdown of part numbers and descriptions. Refer to these drawings when following the disassembly and repair procedures, which begin on page 4-6.

FIGURE 5: FRONT PANEL PARTS LIST

BUBBLE NUMBER	DESCRIPTION	PART NUMBER	QUANTITY
1	FRONT PANEL	808943	1
2	LAMP SPRING	H9193	1
3	LEMO BOARD CONNECTOR (A7)	808716	1
4	4-40 X .438 PAN HEAD SCREW	H314	2
5	SWITCH, A.C. (SW2)	808616	1
6	ACMI ATTEN. ENCORE ASSY	808129-501	1
7	AIR DAM	808769	1
8	LEMO GROUND BRAID (W008)	809052	1
9	LAMP HOLDER	808058	1
10	4-40 X .188 PAN HEAD SCREW	H5090	2
11	6-32 X .630 PAN HEAD SCREW	H319	2
12	4-40 X .375 FLAT HEAD SCREW	H4418	2
13	DIELECTRIC FILTER	495111	1
14	SNAP RING INTERNAL	809242	1
16	LEMO/INPUT FLEX CIRCUIT (W007)	808934	1

FIGURE 5:

FRONT PANEL EXPLODED VIEW



Reference Drawing #809344

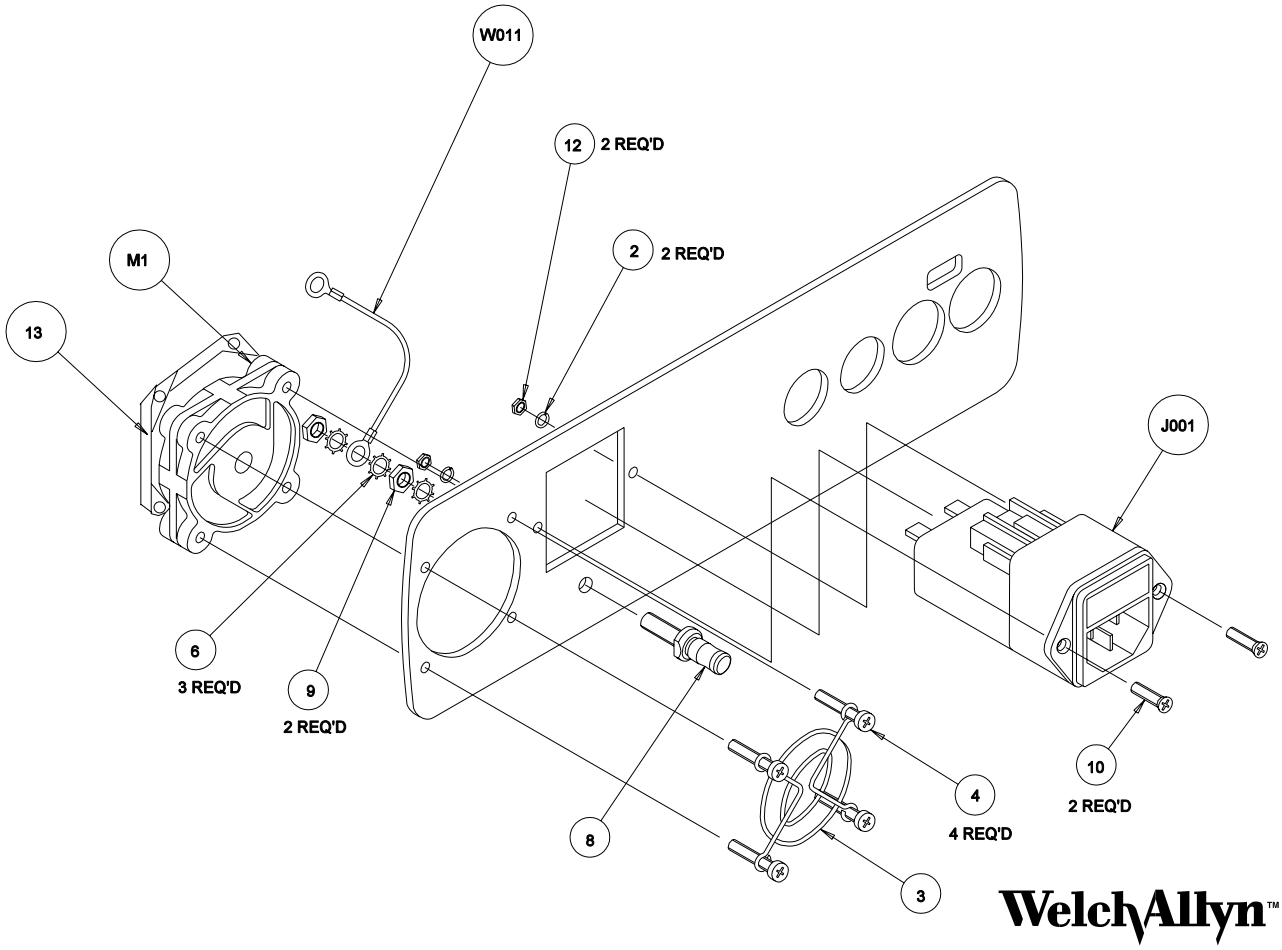
1 Critical alignment for distal probe interface.

FIGURE 6: REAR PANEL PARTS LIST

BUBBLE NUMBER	DESCRIPTION	PART NUMBER	QUANTITY
J001	MODULE, POWER MED RFI FILTER	809230	1
M1	FAN	496124	1
W011	WIRE HARNESS	808819	1
1	REAR PANEL	808715	1
2	#4 SPLIT MED LOCKWASHER	H326	2
3	FAN GUARD	H9211	1
4	4-40 X .625 PAN HEAD PHILLIPS SCREW	H4738	4
6	#10 EXT. LOCKWASHER	H2640	3
8	GROUND STUD	H8963	1
9	10-32 HEX NUT	H240	2
10	4-40 X .375 FLAT HEAD PHILLIPS	H7536	2
12	4-40 HEX NUT	H237	2
13	FAN MOUNTING PLATE	496124	1

Figure 6

Rear Panel Exploded View

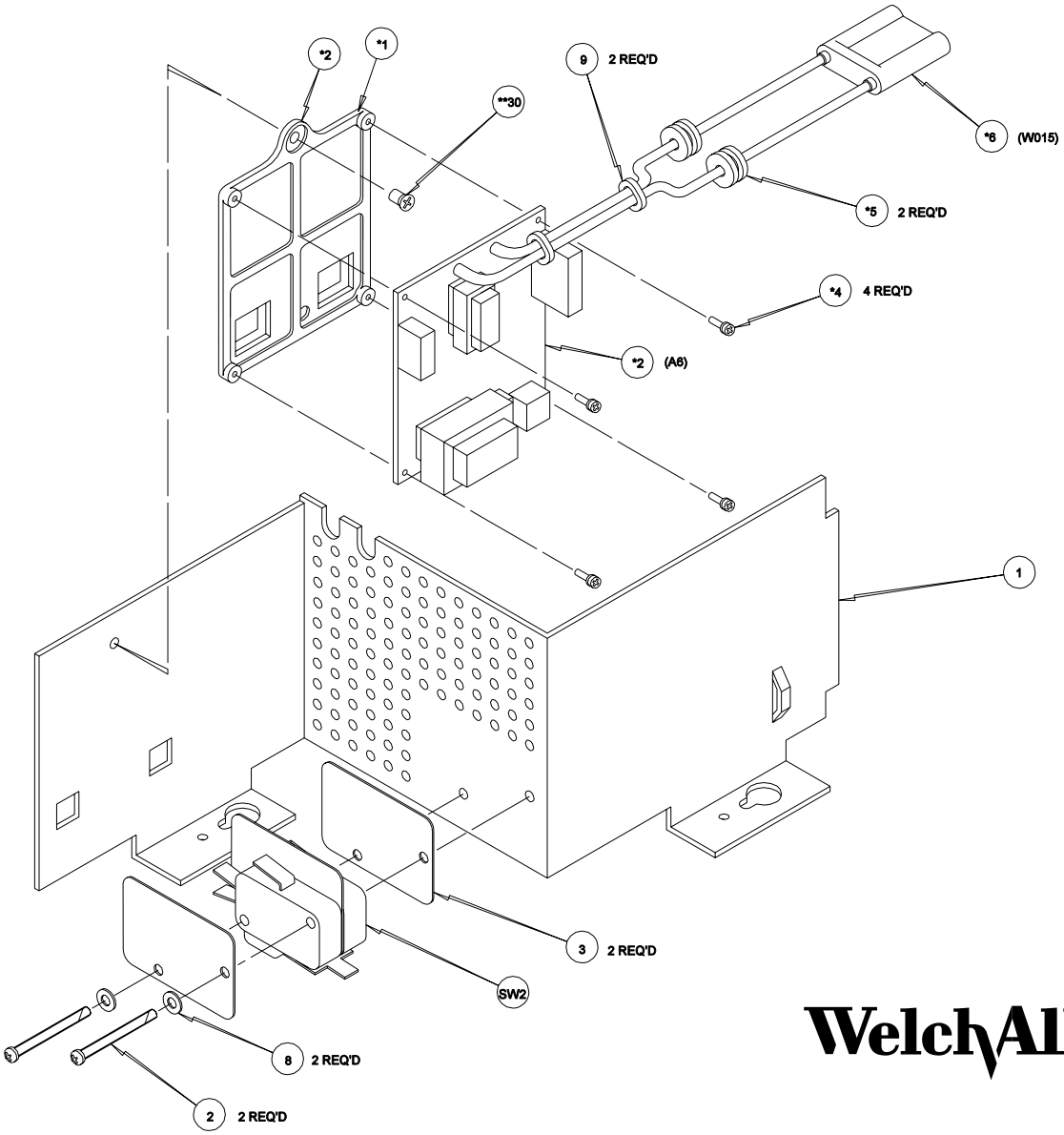


Reference Drawing #808626

FIGURE 7: INNER CHASSIS PARTS LIST

BUBBLE NUMBER	DESCRIPTION	PART NUMBER	QTY
1	INNER CHASSIS	808683	1
2	4-40 X 1.00 PAN HEAD PHILLIPS SCREW	800319-5	2
3	INSULATING PLATE	H2041	2
8	#4 INTERTOOTH LOCK WASHER	H1697	2
9	WIRE TIE	H1587	2
SW2	MICROSWITCH, DOUBLE POLE	H7676	1
*1	BALLAST PLATE	808611	1
*2	BALLAST 24 WATT UNREGULATOR (A6)	43205119-02	1
*4	2-56 X .188 PAN HEAD PHILLIPS SCREW	H8772	4
*5	GROMMET, .126 ID X .06	H7674	2
*6	CONNECTOR BALLAST SIDE (W015)	808147-1	1
**30	4-40 X .250 PAN HEAD PHILLIPS SCREW	H311	1

FIGURE 7: INNER CHASSIS EXPLODED VIEW

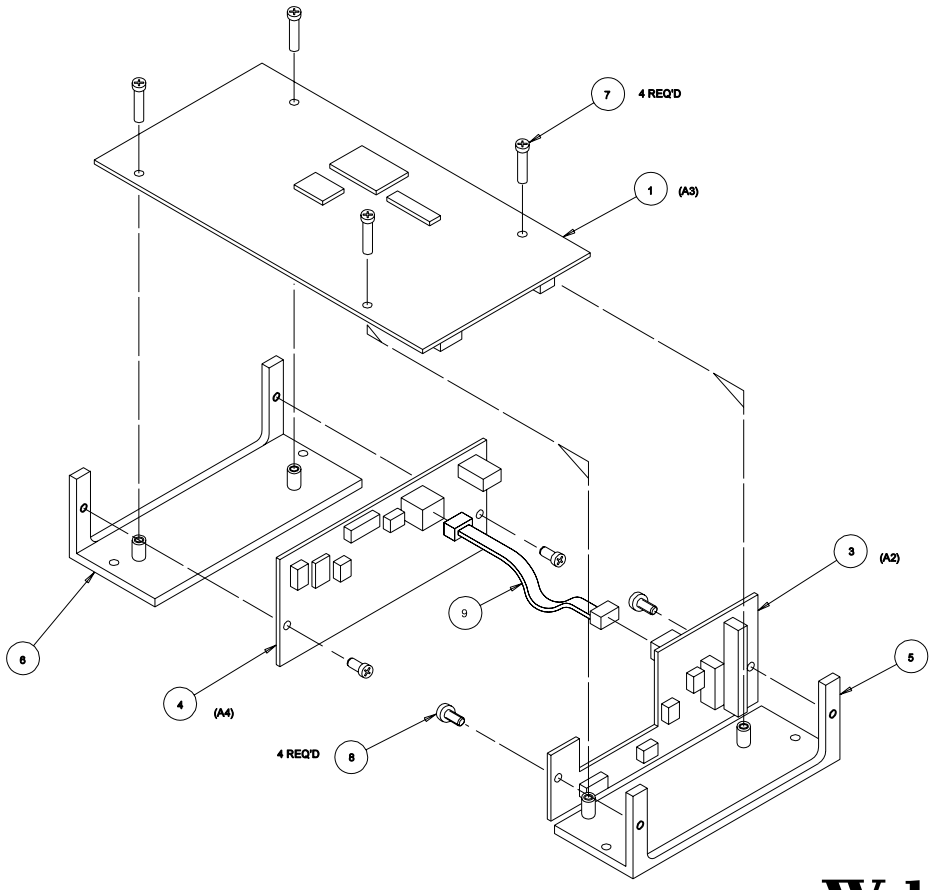


Reference Drawing #808619, *809055, **809351

FIGURE 8: BOARD SET ASSEMBLY PARTS LIST

BUBBLE NUMBER	DESCRIPTION	PART NUMBER	QTY
1	VIDEO BOARD NTSC	808821	1
3	FRONT BOARD ASSEMBLY	808757	1
4	OUTPUT BOARD ASSEMBLY	808654	1
5	FRONT BRACKET	808741	1
6	OUTPUT BRACKET	808741-1	1
7	4-40 X .500 PAN HEAD SCREW	806426-8	4
8	4-40 X .250 PAN HEAD SCREW	806426-7	4
9	INPUT/OUTPUT FLEX CABLE	808933	1

FIGURE 8: BOARD SET ASSEMBLY EXPLODED VIEW

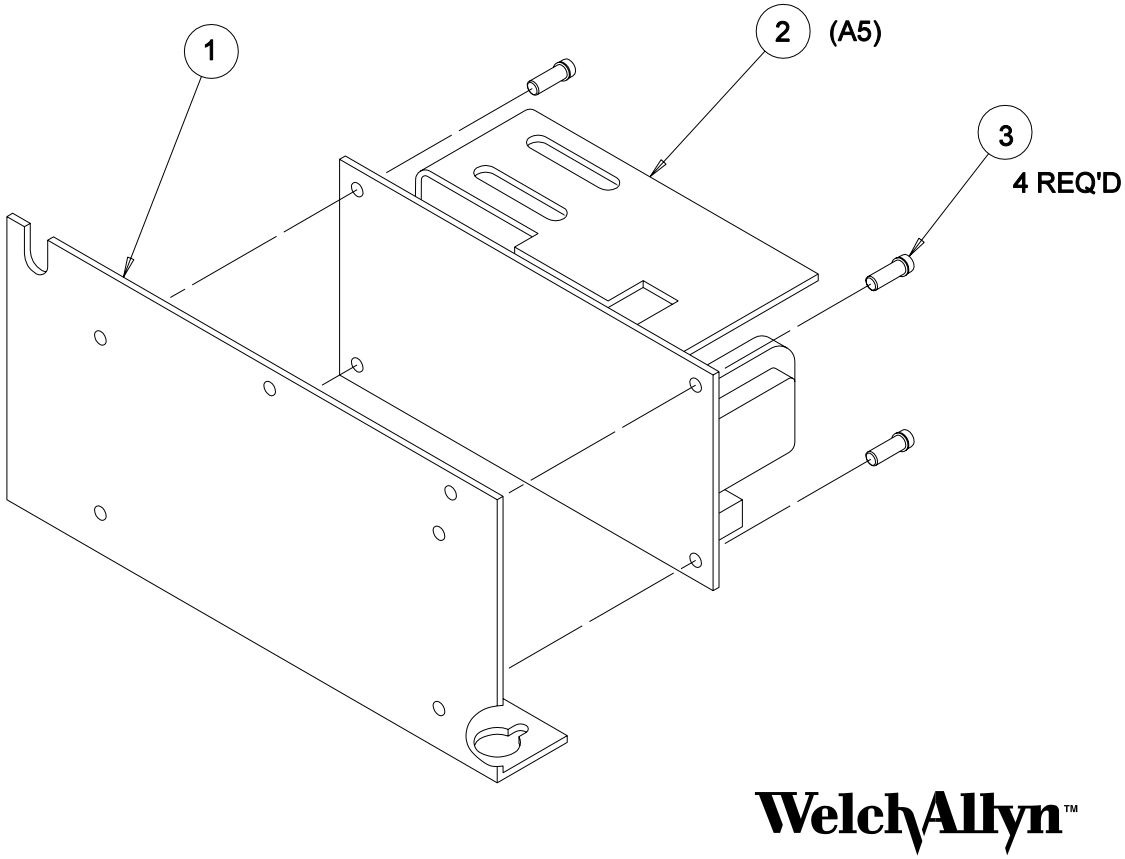


Reference Drawing #808623

FIGURE 9: POWER SUPPLY PARTS LIST

BUBBLE NUMBER	DESCRIPTION	PART NUMBER	QTY
1	BRACKET	809116	1
2	POWER SUPPLY (A5)	809115	1
3	4-40 X .312 PAN HEAD SCREW	806426-1	4

FIGURE 9: POWER SUPPLY EXPLODED VIEW

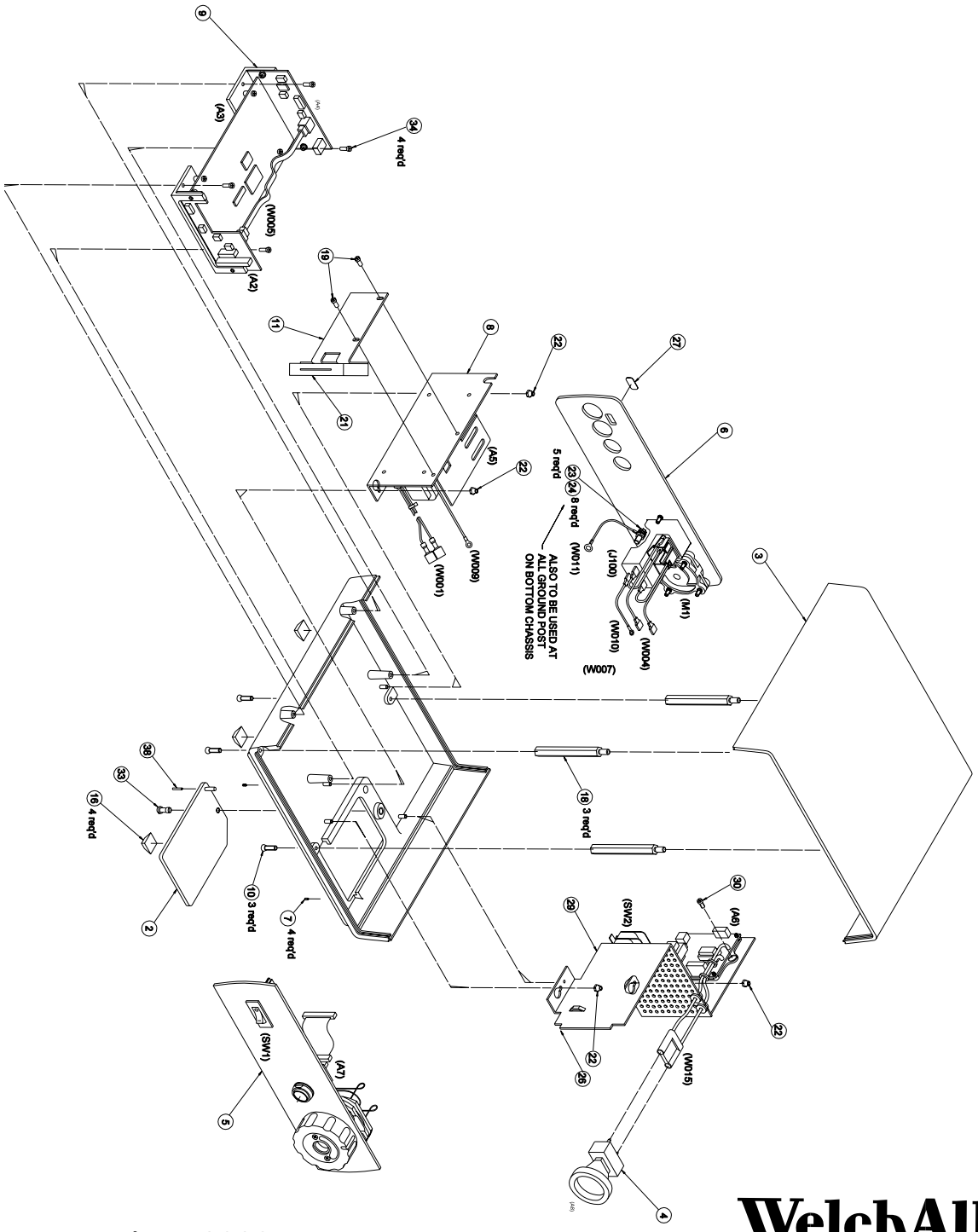


Reference Drawing #808872

FIGURE 10: LIGHT BOX ASSEMBLY PARTS LIST

BUBBLE NUMBER	DESCRIPTION	PART NUMBER	QTY
1	HOUSING BOTTOM	809341-1	1
2	LAMP ACCESS DOOR	808618-1	1
3	HOUSING TOP	809342-1	1
4	LAMP (A8)	808111	1
5	ASSY, FRONT PANEL	809344	1
6	ASSY, REAR PANEL	808626	1
7	4-40 X .125 SET SCREW	H999	4
8	ASSY, POWER SUPPLY (A5)	808872	1
9	ASSY, CIRCUIT BOARD (A2, A3, & A4)	808623	1
10	10-32 X .500 FLAT HEAD SCREW	H8947	3
11	FERRITE BEAD BRACKET	809141	1
16	RUBBER FEET	808615	4
18	STAND OFF	808972	3
19	4-40 X .250 PAN HEAD PHILLIPS SCREW	806429-7	2
21	FERRITE BEAD	808187	1
22	6-32 SELF LOCKING NUT	H4463	4
23	10-32 HEX NUT	H240	5
24	#10 EXTERNAL LOCK WASHER	H2640	8
26	ASSEMBLY, INTERNAL CHASSIS	808619	1
27	REAR PANEL PORT COVER	808760	1
29	ASSEMBLY, BALLAST BOARD (A6)	809055	1
30	4-40 X .250 PAN HEAD PHILLIPS SCREW	H311	1
33	LAMP ACCESS DOOR SCREW	809062	1
34	4-40 X .312 PAN HEAD PHILLIPS SCREW	806426-1	4
38	4-40 X .375 SET SCREW	809237	1

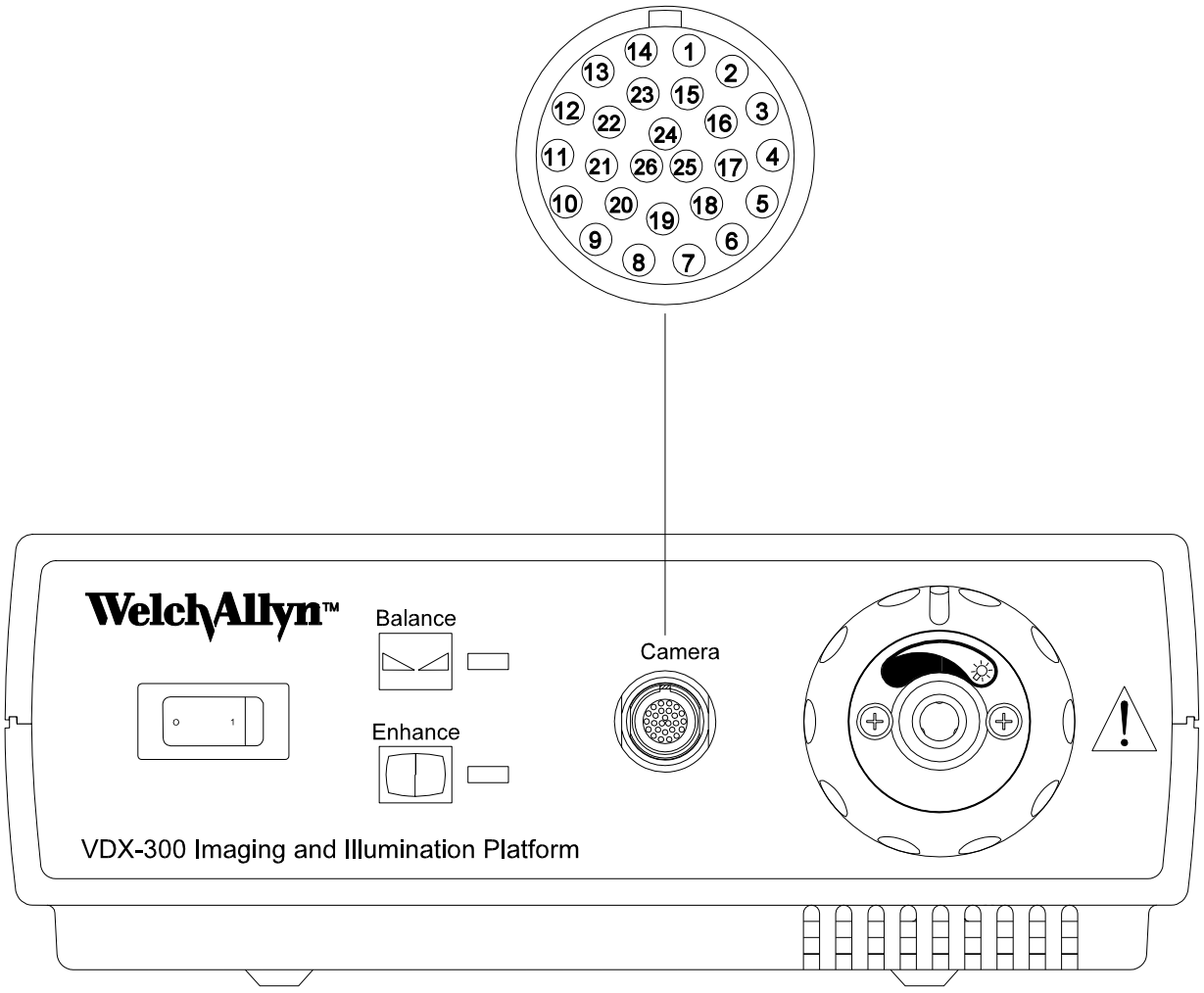
FIGURE 10: LIGHT BOX ASSEMBLY EXPLODED VIEW



Reference Drawing #809351

Figure 11

LEMO Connector Diagram



Front Panel Assembly (809351 #5) Removal and Replacement

1. Remove top housing (809351 #3) by removing 3 screws (809351 #10) found at the bottom of the light box.

2. Disconnect and remove the lamp (809351 #4).

3. Remove ferrite bead (809351 #21) and bracket (809351 #11) as follows:
   a. Disconnect flex ckt (W007) between the Lemo board (808625 #3) found on the front panel assy and the input board of the video board set assy (809351 #9).

   b. Remove the two screws (809351 #19) securing the ferrite bead (809351 #21) and bracket (809351 #11) to the power supply (809351 #8) and remove.

4. Disconnect the flex ckt (W006) from the front panel assy and the input board of the video board set assy (809351 #9).

5. Cut the wire tie securing the power harnesses (W001 & W014) to the on/off switch and disconnect the wire harnesses.

6. Free the Lemo ground braid (808625 #8) from the bottom housing (809351 #1) by removing the 2 hex nuts (809351 #23).

7. Set aside the front panel and replace as necessary.

8. Reassemble in reverse order Note: Secure flex ckt (W007) and flex ckt (W006) to the video board and Lemo board before securing the rest of the front housing assemblies. Note torques specs found on the appropriate figures.

**QP Ensure flexes are aligned properly into connectors.

**QP Align ferrite bracket so that flex circuit is clearing top and bottom of hole in ferrite. Tighten screws and wiggle bracket to verify flex is floating.

Video Board Set (809351 #9) Removal and Replacement

1. Remove top housing (809351 #3) by removing 3 screws (809351 #10) found at the bottom of the light box.

2. Free the Video Board Set (809351 #9) from the bottom housing (809351 #1) by removing the 4 screws (809351 #34).

3. Remove the fan harness assembly (W003) P9 from connector J9 on the Video Board Set (809351 #9).

4. Carefully free the 2 flex ckts (W006 & W007) from the input board of the Video Board Set (809351 #9) and lift out and away.

5. Replace and Reassemble in reverse order. Note that you may want to partially remove the front panel assembly in order to reattach the

flex ckts to the input board of the Video Board Set (809351 #9).

Power Supply (809351 #8) Removal and Replacement

1. Remove top housing (809351 #3) by removing 3 screws (809351 #10) found at the bottom of the light box.

2. Loosen the 2 self locking nuts (809351 #22) securing the power supply (809351 #8) to the bottom housing (809351 #1).

3. Free the front panel (809351 #5) assembly temporarily as follows:
   a. Disconnect flex ckt (W007) between the Lemo board ((808625 #3) found on the front panel assy and the input board of the video board set assy (809351 #9).

   b. Remove the two screws (809351 #19) securing the ferrite bead (809351 #21) and bracket (809351 #11) to the power supply (809351 #8) and remove.

   c. Disconnect the flex ckt (W006) from the front panel assy and the input board of the video board set assy (809351 #9).

   d. Lift up and lay the front panel (809351 #5) flat and out of the way.

4. Free the power supply ground harness (W009) from the bottom housing (809351 #1) by removing the top hex nut (809351 #23).

5. Cut the wire tie securing the main power wire harnesses (W001 & W014) to the internal chassis assembly (809351 #26).

6. Disconnect the main power wire harness (W001) from the power supply, lift the power supply up and disconnect the DC and fan wire harness (W003). Lift out and remove the power supply.

7. Replace and reassemble in reverse order. Note: Secure flex ckt (W007) and flex ckt (W006) to the video board and Lemo board before securing the rest of the front housing assemblies. Note torque specs found on the appropriate figures.

Ballast Board (809351 #29) Removal and replacement

1. Remove top housing (809351 #3) by removing 3 screws (809351 #10) found at the bottom of the light box.

2. Remove the screw (809351 #30) securing the ballast board (809351 #29) to the internal chassis assembly (808826 #26).

3. Lift the ballast and bracket up and out and away from the internal chassis assembly (808826 #26) (which is secured by ballast bracket tabs that fit snugly into slots in the internal chassis assembly (808826 #26)).

4. Remove the DC and fan wire harness (W003) from the ballast, and remove.

5. Replace and reassemble in reverse order.

Fan and Wire Harness Assembly (808626 M1 and W011) Removal and Replacement

1. Remove top housing (809351 #3) by removing 3 screws (809351 #10) found at the bottom of the light box.

2. Free the Video Board Set (809351 #9) from the bottom housing (809351 #1) by removing the 4 screws (809351 #34).

3. Slide the Video Board Set (809351 #9) forward and lift the rear panel asm (809351 #6) up and out from the bottom housing (809351 #1).

4. Free the rear panel asm (809351 #6) up and out from the bottom housing (809351 #1) by removing the 3 nuts (809351 #23) securing the ground wire harness (W0018) to the bottom housing (809351 #1).

5. Free the fan from the rear panel asm (809351 #6) by removing the 4 screws (808626 #4).

6. Free the ballast board assembly (See previous disassembly) and unplug harness connector P28 from it.

7. Unplug connectors P2 and P9 from the power supply and video board set respectively.

8. Remove, replace, and reassemble in reverse order.

RFI Power Module Removal and Replacement

1. Remove top housing (809351 #3) by removing 3 screws (809351 #10) found at the bottom of the light box.
2. Free the Video Board Set (809351 #9) from the bottom housing (809351 #1) by removing the 4 screws (809351 #34).
3. Slide the Video Board Set (809351 #9) forward and lift the rear panel asm (809351 #6) up and out from the bottom housing (809351 #1).
4. Free the rear panel asm (809351 #6) up and out from the bottom housing (809351 #1) by removing the 3 nuts (809351 #23) securing the ground wire harness (W0018) to the bottom housing (809351 #1).
5. Cut wire tie securing wire harness W004 together.

   Note wire location for proper reassembly. Consult Interconnect Diagram as necessary.

6. Unplug wire harness W004 from the RFI module.
7. Remove the 2 screws and nuts (809351 #10 & #12) securing the RFI module to the rear panel asm (809351 #6) and remove the RFI Module.
8. De-solder the two wire harnesses W012 and W013 and ground harness W010 from the Module (For use on the replacement module).
9. Replace and reassemble in reverse order.

Section

5 Maintenance

Preventative Maintenance

The purpose of preventative maintenance is to pro-actively reduce or eliminate future problems. Keeping the VDX-300 in good operating condition ensures that it will perform reliably and safely. Every six to twelve months, you should:

Check the Fiber Optic Bundle for wear

Check all Video and Power Cables for wear

Check the CCD cable for signs of wear

Ensure that, during use, the VDX-300 receives adequate ventilation

Additional recommendations can be found in your VDX-300 Operating Manual.

Visual Inspection

Check for anything out of the ordinary in all of the components of theVDX-300. For instance, are any of the video or power cables showing signs of age (cracking or fraying)? Are there broken fibers in the Fiber Optic Bundle? (see section on Performance Checks) Does the VDX-300 make too much noise? Are there any loose parts inside the Platform Box? Are there any signs of leaking in or around the Camera Head?

Cleaning

The Front Panel VDX-300 Platform box should be cleaned routinely with a damp cloth, as described in the VDX-300 Operating Manual. Users should also routinely inspect the exhaust fan on the back panel of the unit, as well as the exhaust holes on the Bottom Chassis, to make sure that air is able to flow freely through the VDX-300. Any debris around the exhaust fan or ventilation holes should be removed using a vacuum cleaner.

The interfaces of the Fiber Optic Bundle should also be cleaned routinely.

Check Ground Impedance

1. Disconnect the power cord from the VDX-300 Platform Box.

2. Connect an ohmmeter (measuring at milli-ohms) between ground terminal of the appliance inlet receptacle and the following test points: (1) Equipment ground stud on rear panel, and (2) Camera's LEMO shell (connector).

3. Ensure that the ground impedance is less than 0.1 ohms.

Measuring VDX-300 Leakage Current

To check the VDX-300 Chassis Leakage Current:

1. Connect the VDX-300 to a leakage tester, and measure leakage current on leakage meter. Ensure that leakage is less than 100 microamperes.

2. Open ground line, and ensure leakage current is less than 100 microamperes.

3. Reverse line polarity, and ensure that leakage current is less than 100 microamperes.

4. With reversed polarity, open ground line and ensure leakage is less than 100 microamperes.

5. Repeat steps 2, 3, and 4 with the "line" switch set to open.

Always use a high quality meter capable of testing to AAMI specifications.

CAUTION: The meter must be suitably insulated and capable of withstanding the power line voltage.

Measuring VDX-300 Leakage Current with Multiple Accessories

Generally, leakage current for the VDX-300 can be measured independently. However, when the VDX-300 Illumination and Imaging system is used in conjunction with other video accessories (such as printers and VCRs), it may be necessary to measure the leakage current of the entire set up. A typical multiple component setup is shown below.

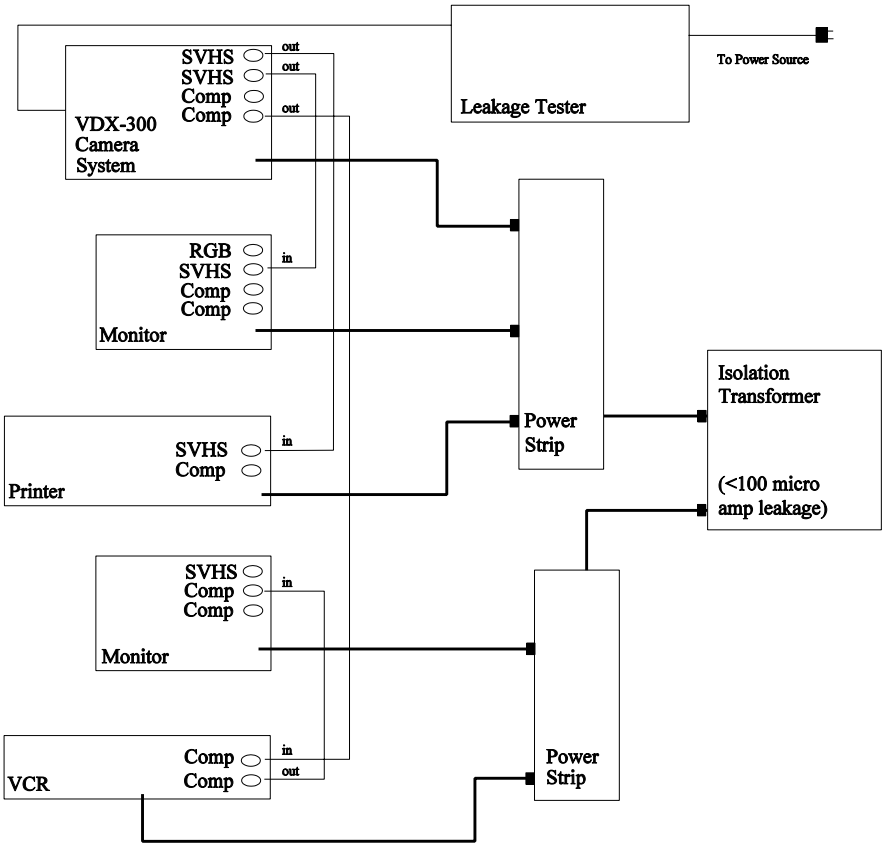


Figure 12: Diagram illustrating typical leakage current test setup, when the VDX-300 is used with multiple accessories.

An isolation transformer must be used if the leakage current exceeds 100 microamperes, in order to conform with EN60601-1 standards. The maximum allowable leakage current of the patient applied part (Type F Endoscope) is 100 microamperes.

Section

6 Theory of Operations

Introduction

The VDX-300 Platform integrates an illumination source with video processing functions. The system is designed to be a platform that is compatible with detachable probes. Currently both a Proximal Camera and a Distal Laparoscope have been developed. The VDX-300 is comprised of three major electrical components, they are the Power Supply, the Video Processing Assembly, and the Lamp Ballast. This section describes each of components. Refer to Drawing 808898 for the Functional Block Diagram, which illustrates how these subassemblies are interconnected. The unit also provides a manual light control mechanism to allow the user to manually adjust the amount of light exiting the unit.

Start Up Routine

When the power switch is initially set to the ON (**|**) position, the cooling fan starts, and the Solarc lamp is ignited. The lamp requires approximately fifteen seconds to warm up to operating temperature. During this time the color and brightness of the light emitted by the lamp may fluctuate. If the lamp had been previously operating, it must be allowed to cool approximately 15 seconds prior to attempting to re-start the lamp. If there is **NOT** a probe connected to the VDX-300, the white balance LED will illuminate. If there **IS** a probe connected to the VDX-300, no LEDs will illuminate.

Mains Power Flow

Refer to the Platform interconnection diagram

Mains power enters the platform box at the rear of the unit. This module serves to provide EMI and RFI filtering and also contains the serviceable fuses necessary for product protection. Mains power is then routed to the SW2 power interlock switches which open the power circuit when the lamp door is opened.

If the lamp door is closed, power is then fed to the SW1 power switch located on the front panel. If this switch is turned on, power then flows to the AC to DC Power Supply.

AC to DC Power Supply

(A5 of interconnection diagram)

UNIVERSAL INPUT, SWITCH MODE AC to DC MEDICAL GRADE POWER SUPPLY

The power supply is rated to accept an input voltage of 85-264 VAC, 47/63 Hz, single phase. It is designed to provide approximately 40 watts of output power at an efficiency of 72% minimum. The primary circuit provides adequate control of leakage current, which is limited to 35 microamps maximum. The primary side of the power supply rectifies the AC voltage and converts it to a high voltage DC level. The DC voltage is routed though a mosfet switching device to an isolation transformer. The mosfet is triggered by a high frequency clock circuit, typically at a 30-50 Khz rate. The secondary side of this transformer provides isolation between primary and secondary circuits. The secondary voltage is rectified and filtered to provide a 2.7 amp, +15 VDC output voltage. This output voltage is regulated to 2%, and noise and ripple is limited to 1%. The output is fully protected against short circuit and output overload. The short circuit protection is a cycling type power limit with automatic recovery after fault.

As typical of most switch mode power supplies a minimum load is specified for proper operation. The supply must have a minimum load of 30mA.

Reference interconnect diagram, the +15 volt DC power from this supply then flows to two assemblies; the Arc Lamp Ballast and the Video Output board (A4) of the Video Processing Assembly.

Arc Lamp Ballast Board

(A6 of interconnection diagram)

The ballast is a power supply used to operate the 24 watt Welch Allyn Solarc miniature arc lamp. The ballast is required to limit the current supplied to the lamp. The ballast goes though three stages of operation at power up, ignition, warm up, and steady state. To ignite the lamp, the ballast provides a series of high voltage (up to 7 Kilovolts) ignition pulses. Once the lamp is ignited, the ballast conducts current at a very low impedance. This constitutes the warm up stage. After warm up, the impedance changes to a higher steady state value. Voltage across the lamp then is approximately 60-65 VDC.

Video Processing Assembly

The video processing assembly consists of three circuit boards, the video input board, the video control board, and the video output board.

Video Output Board
(A4 of interconnection diagram)

The video output board provides composite video, and S- video outputs for the product. These connectors allow the use of external video devices, such as monitors, VCRs, and hard copy printers to receive the video signals. This board also has circuitry to program certain operational modes with resetable switches. It also has video output buffer and voltage conversion circuits, and a connection port to allow for factory computer programming of the video control board.

Referencing drawing 808898, for D.C. power purposes, this board then sends the +15 volts on to the video control board and also creates a +12v output to operate the cooling fan.

Video Control Board
(A3 of interconnection diagram)

The video control board generates the signals that are necessary to drive the image sensing device in the detachable camera assembly. It also processes the video signals that are produced by the imaging device into composite and S- video output signals and outputs them to the video output board. It also has on board voltage conversion circuitry necessary to create various voltages for board as well as detachable camera use.

Video Input Board
(A2 of interconnection diagram)

All necessary communication between the video control board and the detachable camera assemblies is routed through the video input board. The board passes various video clocks and voltages necessary for camera operation and also carries video output of the detachable camera back to the video control board. These are carried on the wider flex circuit that connects to the lemo interface board.
The board also connects via a narrower flex circuit to the front panel membrane switch panel. The board has interface circuitry to provide signal modification between the front panel membrane switches and the video control board. This board also has circuitry to program certain operational modes with resetable switches.

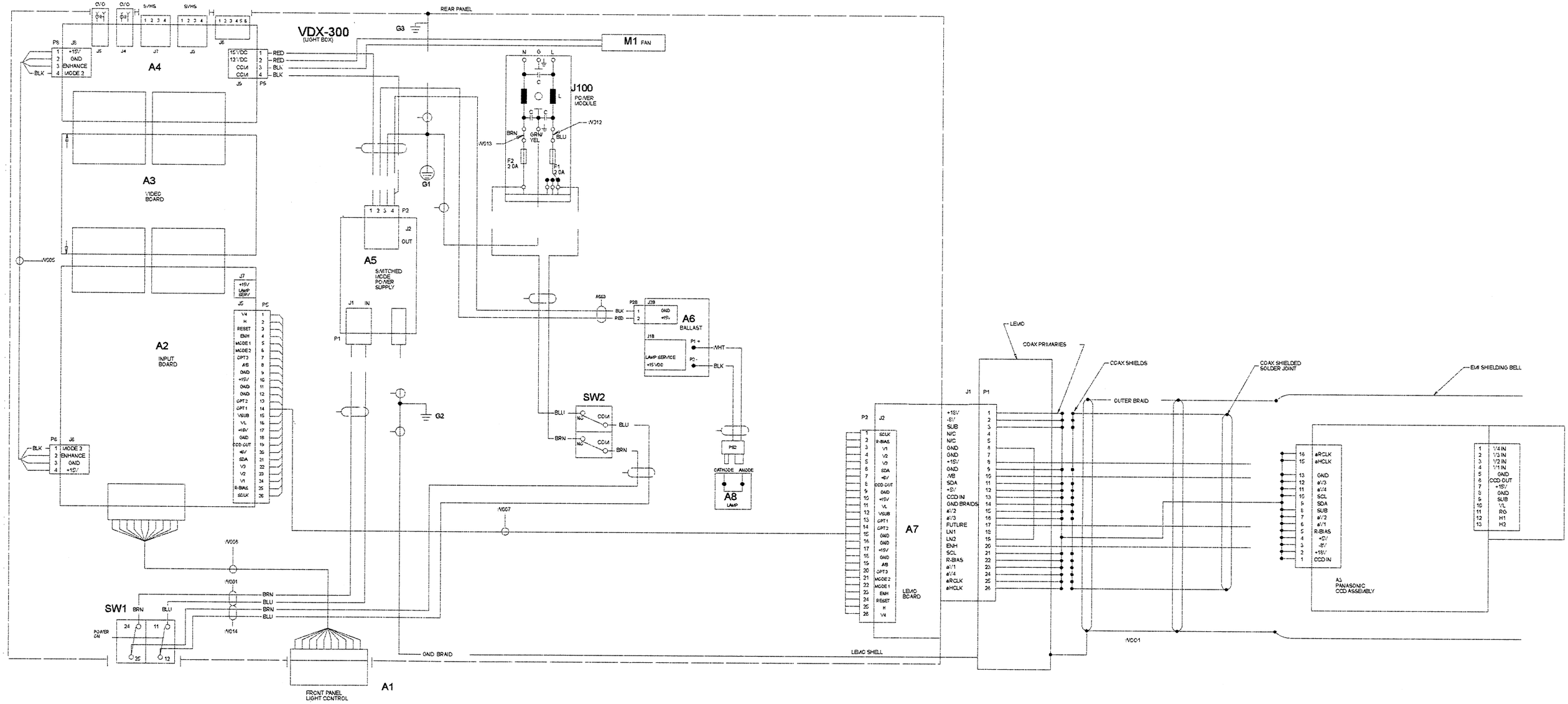
Lemo Inteface Board
(A7 of interconnection diagram)

This board allows the connection of the flex circuit carrying the camera signals and the Lemo connector for camera connection. There are no active circuits on this board.

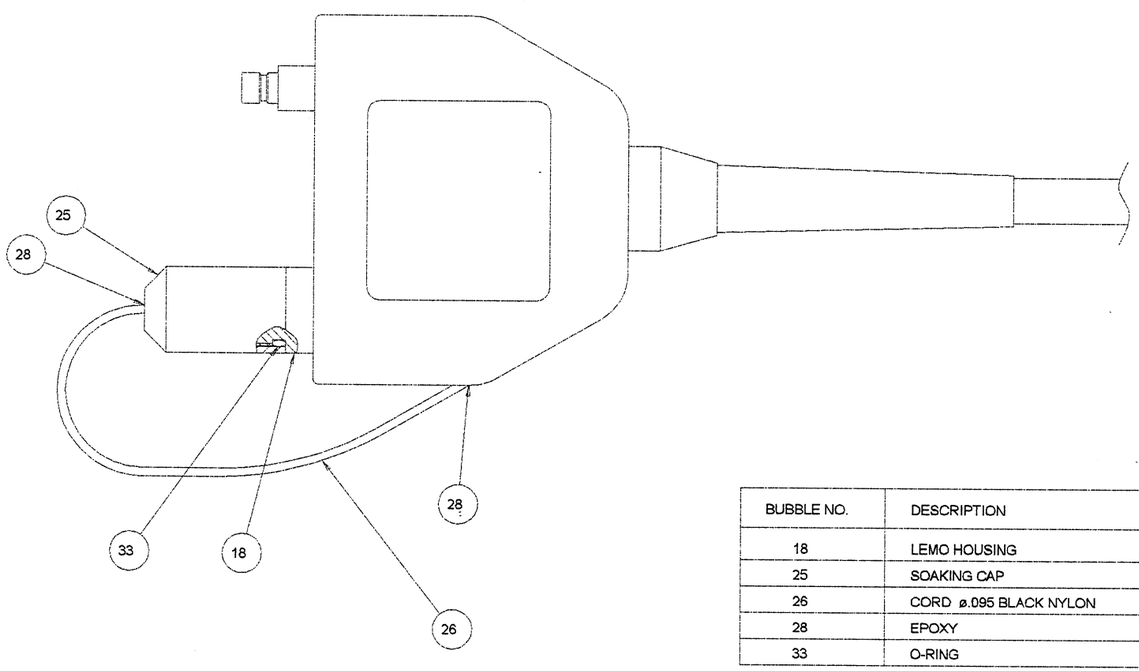
Front Panel Membrane Switch Panel
(A1 of interconnection diagram)

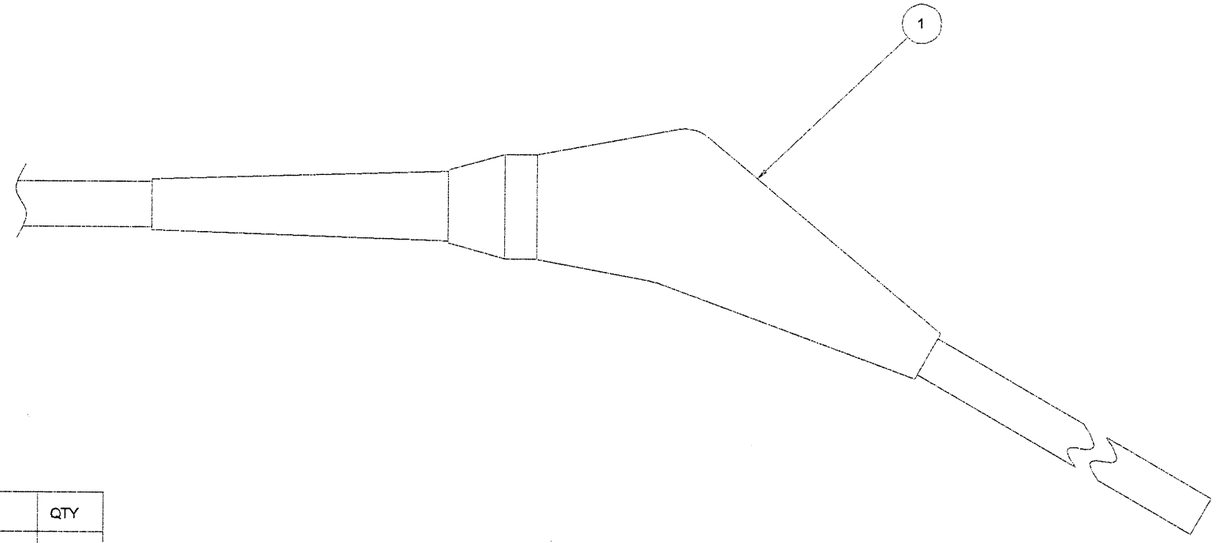
This flexible overlay panel is mounted to the front panel and provides the white balance and edge enhancement switches and LED indicators, which are located on the front panel.

APPENDIX A


VDX-300
(LIGHT BOX)
REAR PANEL
G3
M1 FAN
A4
A3
VIDEO BOARD
A2
INPUT BOARD
A5
SWITCHED MODE POWER SUPPLY
J100
POWER MODULE
G1
A6
BALLAST
LAMP SERVICE +15VDC
A8
LAMP
SW2
SW1
POWER ON
G2
FRONT PANEL LIGHT CONTROL
A1
A7
LEMO
COAX PRIMARIES
COAX SHIELDS
COAX SHIELDED SOLDER JOINT
EMI SHIELDING BELL
OUTER BRAID
A3 PANASONIC CCD ASSEMBLY
LEMO SHELL
GND BRAID

APPENDIX B





BUBBLE NO.	DESCRIPTION	PART NO.	QTY
18	LEMO HOUSING	809072	1
25	SOAKING CAP	809071	1
26	CORD ø.095 BLACK NYLON	H9624	1
28	EPOXY	H7800	A/R
33	O-RING	H9267	1

Welch Allyn VDX-300 Service Manual
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Welch Allyn™